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Volume 19

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OF

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VOLUME 19

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FOR THE COMMANDER



Gary Tetungian  
Administrative Contracting Officer  
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## **FOREWORD**

Volume 19 of Unclassified Publications of Lincoln Laboratory lists reports published from 1 January to 31 December 1993, as well as updated information on earlier publications.

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## QUARTERLY TECHNICAL REPORTS

## SOLID STATE RESEARCH

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1992:4	ADA262874
1993:1	ADA274177
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## TECHNICAL REPORTS

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REV.1	for Surface-Sited Radar		ADA262472
938	Space Qualification for an Intersatellite Laser Communications System	Taylor, J.A. Pillsbury, A.D. Boroson, D.M.	24 Mar. 1993
966	The Application of Synthetic-Beacon Technology to Astronomy	Parenti, R.R. Sasiela, R.J.	17 Mar. 1993
970	Programmable Interactive System for Cochlear Implant Electrode Stimulation	Tierney, J. Zissman, M.A. Eddington, D.K. Rabinowitz, W.M.	12 Jan. 1993
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974	Overview of Enhanced Data Stream Array Processor (EDSAP)	Rocco, A.G. Linton, P.D. Noonan, J.K.	6 May 1993
977	Experimental Evaluation of an Adaptive Focusing Algorithm for a Microwave Planar Phased-Array Hyperthermia System at UCSF	Fenn, A.J. Diedrich, C.J. Stauffer, P.R.	17 May 1993
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979	Pixel-Level Fusion Using "Interest" Images	Delanoy, R.L. Verly, J.G. Dudgeon, D.E.	26 Apr. 1993
981	A Compact, Portable EHF/SHF Antenna for Advanced SCAMP	Lee, J.C.	22 Sep. 1993
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## Technical Reports

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982	Use of the Weiss-Weinstein Bound to Compare the Direction-Finding Performance of Sparse Arrays	DeLong, D.F.	16 Aug. 1993
984	Downlink Acquisition and Tracking Procedures for the ASCAMP Satellite Communications Terminal	Figucia, R.J.	14 Sep. 1993
999	An Adaptive Radio-Frequency Hyperthermia Phased-Array System for Improved Cancer Therapy: Phantom Target Measurements	Fenn, A.J. King, G.A.	19 Nov. 1993

## JOURNAL ARTICLES

### JA No.

6395	Modal Analysis of Circular Plates with a Free Edge and Three Simple Interior Supports	LeClair, R.A.	J. Sound Vib., Vol. 160, No. 2, 15 January 1993, pp. 289–300
6486	M-ary Orthogonal Signaling in the Presence of Doppler	Kachelmyer, A.L. Forsythe, K.W.	IEEE Trans. Commun., Vol. 41, No. 8, August 1993, pp. 1192–1200
6575	Texture and Speckle in High Resolution Synthetic Aperture Radar Clutter	Posner, F.L.	IEEE Trans. Geosci. Remote Sens., Vol. 31, No. 1, January 1993, pp. 192–203 ADA265790
6605	Bistatic Radar Cross Section for a Perfectly Conducting Rhombus-Shaped Flat Plate: Simulations and Measurements	Fenn, A.J. Lutz, J.E.	IEEE Trans. Antennas Propag., Vol. 41, No. 1, January 1993, pp. 47–51
6617	Two CFAR Algorithms for Interfering Targets and Nonhomogeneous Clutter	Wilson, S.L.	IEEE Trans. Aerosp. Electron. Syst., Vol. 29, No. 1, January 1993, pp. 57–72
6620	Phase Variance and Strehl Ratio in Adaptive Optics	Herrmann, J.	J. Opt. Soc. Am. A, Opt. Image Sci., Vol. 9, No. 12, December 1992, pp. 2257–2258 ADA263491
6624	A Simple Exact Method for Generating Continuous Phase Modulated Signals	Boroson, D.M. McKenzie, P.F.	IEEE Trans. Commun., Vol. 41, No. 10, October 1993, pp. 1429–1432 ADA273578
6646	The Design of Arbitrary FIR Digital Filters Using the Eigenfilter Method	Nguyen, T.Q.	IEEE Trans. Signal Process., Vol. 41, No. 3, March 1993, pp. 1128–1139 ADA265820
6653	On Amplitude and Frequency Demodulation Using Energy Operators	Maragos, P. Kaiser, J.F. Quatieri, T.F.	IEEE Trans. Signal Process., Vol. 41, No. 4, April 1993, pp. 1532–1550

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6657	Mellin Transform Methods Applied to Integral Evaluation: Taylor Series and Asymptotic Approximations	Sasiela, R.J. Shelton, J.D.	J. Math. Phys., Vol. 34, No. 6, June 1993, pp. 2572–2617 ADA272557
6668	Transverse Spectral Filtering and Mellin Transform Techniques Applied to the Effect of Outer Scale on Tilt and Tilt Anisoplanatism	Sasiela, R.J. Shelton, J.D.	J. Opt. Soc. Am. A, Opt. Image Sci., Vol. 10, No. 4, April 1993, pp. 646–660 ADA265791
6705	Optimal Polarimetric Processing for Enhanced Target Detection	Novak, L.M. Burl, M.C. Irving, W.W., Jr.	IEEE Trans. Aerosp. Electron. Syst., Vol. 29, No. 1, January 1993, pp. 234–244 ADA262355
6706	Ground-Based Laser Radar Measurements of Satellite Vibrations	Schultz, K.I. Fisher, S.	Appl. Opt., Vol. 31, No. 36, 20 December 1992, pp. 7690–7695 ADA261107
6708	Aligning Lithography on Opposite Surfaces of a Substrate	Everett, P.N. Delaney, W.F.	Appl. Opt., Vol. 31, No. 34, 1 December 1992, pp. 7292–7294 ADA260700
6712	Diode-Pumped Yb:YAG Lasers	Lacovara, P.	LEOS '92, IEEE Lasers and Electro-Optics Society 1992 Annual Mtg., 16–19 November 1992, pp. 491–492
6724	Technique for Velocity-Matched Traveling-Wave Electrooptic Modulator in AlGaAs/GaAs	Khan, M.N. Gopinath, A. Bristow, J.P.G. Donnelly, J.P.	IEEE Trans. Microw. Theory Tech., Vol. 41, No. 2, February 1993, pp. 244–249
6739	Cooperating on Superconductivity	Ralston, R.W. Kastner, M.A. Gallagher, W.J. Batlogg, B.	IEEE Spectr., Vol. 29, No. 8, August 1992, pp. 50–55

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6747A	Maximum-Likelihood Laser Radar Range Profiling with the Expectation-Maximization Algorithm	Green, T.J., Jr. Shapiro, J.H.	Opt. Eng., Vol. 31, No. 11, November 1992, pp. 2343–2354 ADA260699
6759	Analytic Model of Shot Noise in Double-Barrier Resonant-Tunneling Diodes	Brown, E.R.	IEEE Trans. Electron Devices, Vol. 39, No. 12, December 1992, pp. 2686–2693
6771	Adaptive Mathematical Morphology for Range Imagery	Verly, J.G. Delanoy, R.L.	IEEE Trans. Image Process., Vol. 2, No. 2, April 1993, pp. 272–275 ADA272327
6772	An Efficient MRF Image-Restoration Technique Using Deterministic Scale-Based Optimization	Menon, M.M.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 147–160 ADA272563
6785	Optimal Mean Velocity Estimation for Doppler Weather Radars	Chornoboy, E.S.	IEEE Trans. Geosci. Remote Sens., Vol. 31, No. 3, May 1993, pp. 575–586
6786	Metrology of Lithographic Features: Balanced Illumination Eliminating Diffractive Bias	Everett, P.N.	Appl. Opt., Vol. 32, No. 7, 1 March 1993, pp. 1216–1224 ADA268187
6795	A Ti:Al <sub>2</sub> O <sub>3</sub> Master-Oscillator/Power-Amplifier System	Wall, K.F. Schulz, P.A. Aggarwal, R.L. Lacovara, P. Sanchez, A.	IEEE J. Quantum Electron., Vol. 29, No. 6, June 1993, pp. 1505–1514 ADA272134
6796	Flow Regime Map and Deposition Rate Uniformity in Vertical Rotating-Disk OMVPE Reactors	Biber, C.R. Wang, C.A. Motakef, S.	J. Cryst. Growth, Vol. 123, 1992, pp. 545–554

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6797	Dual-Sided Lithography: A Method for Evaluating Alignment Accuracy	Fam, M.W. Kane, J.S. Delaney, W.F.	Appl. Opt., Vol. 31, No. 34, 1 December 1992, pp. 7295–7300
6798	Shared Aperture for Two Beams of Different Wavelength Using Reflective Phase Gratings and the Talbot Effect	Hector, S.D. Swanson, G.J.	Appl. Opt., Vol. 31, No. 34, 1 December 1992, pp. 7267–7276 ADA260518
6799	Coherent Millimeter-Wave Generation by Heterodyne Conversion in Low-Temperature-Grown GaAs Photoconductors	Brown, E.R. Smith, F.W. III McIntosh, K.A.	J. Appl. Phys., Vol. 73, No. 3, 1 February 1993, pp. 1480–1484 ADA263539
6802	Design and Fabrication of a Gaussian Fan-Out Optical Interconnect	Wong, V.V. Swanson, G.J.	Appl. Opt., Vol. 32, No. 14, 10 May 1993, pp. 2502–2511 ADA268366
6805A	Ultralow-Dielectric-Constant Foams by Crystallisation from Supercritical Solution: Application to Advanced Electronic Packaging	Ehrlich, P. Ehrlich, D.J.	Adv. Mater. Opt. Electron., Vol. 1, No. 5, October/November 1992, pp. 249–253 ADA265771
6808	The Role of Hydrogen in Excimer-Laser-Induced Damage of Fused Silica	Levy, D.H. Gleason, K.K. Rothschild, M. Sedlacek, J.H.C.	J. Appl. Phys., Vol. 73, No. 6, 15 March 1993, pp. 2809–2815
6822	Analysis of Heterojunction Bipolar Transistor/Resonant Tunneling Diode Logic for Low-Power and High-Speed Digital Applications	Chang, C.E. Asbeck, P.M. Wang, K-C. Brown, E.R.	IEEE Trans. Electron Devices, Vol. 40, No. 4, April 1993, pp. 685–691

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6825	Radiative Substrate Heating for High- $T_c$ Superconducting Thin-Film Deposition: Film-Growth-Induced Temperature Variation	Westerheim, A.C. Choi, B.I. Flik, M.I. Cima, M.J. Slattery, R.L. Anderson, A.C.	J. Vac. Sci. Technol. A, Vol. 10, No. 6, November/December 1992, pp. 3407–3410 ADA262430
6833	Heat Generation in Nd:YAG and Yb:YAG	Fan, T.Y.	IEEE J. Quantum Electron., Vol. 29, No. 6, June 1993, pp. 1457–1459 ADA272564
6835	Asymptotic Results for Maximum Likelihood Estimation with an Array of Sensors	Benitz, G.R.	IEEE Trans. Inf. Theory, Vol. 39, No. 4, July 1993, pp. 1374–1385
6838	Application of Radiative Renormalization to Strong-Field Resonant Nonlinear Optical Interactions	Blum, O. Harshman, P. Gustafson, T.K. Kelley, P.L.	Phys. Rev. A, At. Mol. Opt. Phys., Vol. 47, No. 6, June 1993, pp. 5165–5179 ADA270565
6840	Emission from OH(A) Produced in the Dissociative Recombination of $H_2O^+$ with Electrons	Sonnenfroh, D.M. Caledonia, G.E. Lurie, J.B.	J. Chem. Phys., Vol. 98, No. 4, 15 February 1993, pp. 2872–2881
6841	Multiquantum-Well Detection of Nanosecond Far-Infrared Superradiant Pulses at Temperatures Above 77K	Waldman, J. Moix, D.B. Scherer, D.P. Kneubuhl, F.K. Goodhue, W.D. Mueller, E.R. Coulombe, M.J.	Infrared Phys., Vol. 33, No. 6, November 1992, pp. 487–491
6846	Radiation Properties of a Planar Antenna on a Photonic-Crystal Substrate	Brown, E.R. Parker, C.D. Yablonovitch, E.	J. Opt. Soc. Am. B, Opt. Phys., Vol. 10, No. 2, February 1993, pp. 404–407 ADA262356

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6854	Polarimetric Synthetic Aperture Radar Imaging	Novak, L.M. Netishen, C.M.	Int. J. Imag. Systems and Technol., Vol. 4, 1992, pp. 306–318 ADA272329
6857	A Quasioptical Resonant-Tunneling-Diode Oscillator Operating Above 200 GHz	Brown, E.R. Parker, C.D. Calawa, A.R. Manfra, M.J. Molvar, K.M.	IEEE Trans. Microw. Theory Tech., Vol. 41, No. 4, April 1993, pp. 720–722
6858	Integrated Electronic Shutter for Back-Illuminated Charge-Coupled Devices	Reich, R.K. Mountain, R.W. McGonagle, W.H. Huang, J.C-M. Twichell, J.C. Kosicki, B.B. Savoye, E.D.	IEEE Trans. Electron Devices, Vol. 40, No. 7, July 1993, pp. 1231–1237 ADA270448
6859A	Narrow-Linewidth Diode Laser Using A Fiber-Optic Ring Resonator	Paul, T.J. Swanson, E.A.	Opt. Lett., Vol. 18, No. 15, 1 August 1993, pp. 1241–1243
6861	A Method for Determining Filter Spacing in Assumed Velocity Filter Banks	Sanders, J.N.	IEEE Trans. Aerosp. Electron. Syst., Vol. 29, No. 3, July 1993, pp. 1043–1046 ADA270416
6863	An Electron Spin Resonance Study of the Effects of Thermal Nitridation and Reoxidation on Pb Centers at (111) Si/SiO <sub>2</sub> Interfaces	Yount, J.T. Lenahan, P.M. Wyatt, P.W.	J. Appl. Phys., Vol. 74, No. 9, 1 November 1993, pp. 5867–5870
6865	Coherent Detection with a GaAs/AlGaAs Multiple Quantum Well Structure	Brown, E.R. McIntosh, K.A. Smith, F.W. III Manfra, M.J.	Appl. Phys. Lett., Vol. 62, No. 13, 29 March 1993, pp. 1513–1515 ADA270134

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6870	Modeling of Positive-Tone Silylation Processes for 193-nm Lithography	Hartney, M.A.	J. Vac. Sci. Technol. B, Vol. 11, No. 3, May/June 1993, pp. 681–687 ADA270218
6871	Photolithography at 193 nm	Rothschild, M. Goodman, R.B. Hartney, M.A. Horn, M.W. Kunz, R.R. Sedlacek, J.H.C. Shaver, D.C.	J. Vac. Sci. Technol. B, Vol. 10, No. 6, November/December 1992, pp. 2989–2996 ADA261045
6872	Resonant Tunneling Through Mixed Quasibound States in a Triple-Well Structure	Brown, E.R. Parker, C.D. Calawa, A.R. Manfra, M.J.	Appl. Phys. Lett., Vol. 62, No. 23, 7 June 1993, pp. 3016–3018 ADA270189
6874	Model-Based System for Automatic Target Recognition from Forward-Looking Laser-Radar Imagery	Verly, J.G. Delanoy, R.L. Dudgeon, D.E.	Opt. Eng., Vol. 31, No. 12, December 1992, pp. 2540–2552 ADA263493
6875	1 Gbit/s Coherent Optical Communication System Using a 1 W Optical Power Amplifier	Alexander, S.B. Kintzer, E.S. Livas, J.C. Walpole, J.N. Wang, C.A. Missaggia, L.J. Chinn, S.R.	Electron. Lett., Vol. 29, No. 1, 7 January 1993, pp. 114–115 ADA272325
6877	A Novel Metal-Insulator-Metal Structure for Field-Programmable Devices	Cohen, S.S. Soares, A.M. Gleason, E.F. Wyatt, P.W. Raffel, J.I.	IEEE Trans. Electron Devices, Vol. 40, No. 7, July 1993, pp. 1277–1283 ADA270133
6878	Adaptive Spatially Injection-Locked Heterodyne Receiver	Adams, L.E. Bondurant, R.S.	Opt. Lett., Vol. 18, No. 3, 1 February 1993, pp. 226–228 ADA263538

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6881	Degradation of Superconducting Tunnel Junction Characteristics with Increasing Barrier Transparency	Kleinsasser, A.W. Rammo, F.M. Bhushan, M.	Appl. Phys. Lett., Vol. 62, No. 9, 1 March 1993, pp. 1017–1019
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6883	The TRADEX Multitarget Tracker	Meurer, G.W., Jr.	Linc. Lab. J., Vol. 5, No. 3, Fall 1992, pp. 317–350 ADA270265
6885	Receiver Autonomous Integrity Monitoring (RAIM) of GPS and GLONASS	Misra, P.N. Bayliss, E.T. LaFrey, R.R. Pratt, M.M. Muchnik, R.	Navig. J. Inst. Navig., Vol. 40, No. 1, Spring 1993, pp. 87–104
6890	Measurements of Optical-Heterodyne Conversion in Low-Temperature-Grown GaAs	Brown, E.R. McIntosh, K.A. Smith, F.W. III Manfra, M.J. Dennis, C.L.	Appl. Phys. Lett., Vol. 62, No. 11, 15 March 1993, pp. 1206–1208 ADA268367
6893	Molecular-Beam Epitaxy Growth of Semiconductor Heterostructure Optical Converter Lasers Using the InGaAs/AlGaAs Materials System	Goodhue, W.D. Le, H.Q. DiCecca, S.	J. Vac. Sci. Technol. B, Vol. 11, No. 3, May/June 1993, pp. 948–951 ADA270264

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6894	Diode-Pumped Q-Switched Yb:YAG Laser	Fan, T.Y. Klunk, S. Henein, G.	Opt. Lett., Vol. 18, No. 6, 15 March 1993, pp. 423-425 ADA265770
6895	Quantum Well GaAs/AlGaAs Shallow-Donor Far-Infrared Photoconductors Grown by Molecular-Beam Epitaxy	Goodhue, W.D. Mueller, E.R. Larsen, D.M. Waldman, J. Chai, Y.H. Lai, S.C. Johnson, G.D.	J. Vac. Sci. Technol. B, Vol. 11, No. 3, May/June 1993, pp. 941-944 ADA270180
6896	Impact of Weather Event Uncertainty Upon an Optimum Ground-Holding Strategy	Andrews, J.W.	Air Traffic Control Q., Vol. 1, No. 1, January 1993, pp. 59-84
6899	Studies of Carrier Heating in InGaAs/AlGaAs Strained-Layer Quantum Well Diode Lasers Using a Multiple Wavelength Pump Probe Technique	Sun, C-K. Choi, H-K. Wang, C.A. Fujimoto, J.G.	Appl. Phys. Lett., Vol. 62, No. 7, 15 February 1993, pp. 747-749
6901	Wireless Focal Planes "On the Road to Amacronic Sensors"	Veldkamp, W.B.	IEEE J. Quantum Electron., Vol. 29, No. 2, February 1993, pp. 801-813 ADA265792
6904	Super-Resolution Methods for Wideband Radar	Borison, S.L. Bowling, S.B. Cuomo, K.M.	Linc. Lab. J., Vol. 5, No. 3, Fall 1992, pp. 441-461 ADA270145
6906	The NOMAC and Rake Systems	Ward, W.W.	Linc. Lab. J., Vol. 5, No. 3, Fall 1992, pp. 351-366 ADA270144
6908	Small-Signal Admittance and Switching Measurements of the Resonant-Tunneling Diode	Mattia, J.P. Brown, E.R. Calawa, A.R. Manfra, M.J.	Appl. Phys. Lett., Vol. 63, No. 4, 26 July 1993, pp. 521-523 ADA271894

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6909	Frequency Dispersion of Transconductance and Output Resistance in GaAs MESFETs with Low-Temperature-Grown GaAs Passivation Layers	Chen, C-L. Smith, F.W. III Mahoney, L.J. Manfra, M.J. Calawa, A.R.	Electron. Lett., Vol. 29, No. 5, 4 March 1993, pp. 499-501 ADA273606
6910	A Near-Optimum Discriminator Demodulator for Binary FSK with Wide Tone Spacing	Stevens, M.L. Boroson, D.M. Kaufmann, J.E.	IEEE Microw. Guid. Wave Lett., Vol. 3, No. 7, July 1993, pp. 227-229 ADA270449
6911A	Critical Layer Thickness of Strained-Layer InGaAs/GaAs Multiple Quantum Wells Determined by Double-Crystal X-Ray Diffraction	Wang, C.A. Groves, S.H. Reinold, J.H. Calawa, C.R.	J. Electron. Mater., Vol. 22, No. 11, November 1993, pp. 1365-1368
6912	Color Separation by Use of Binary Optics	Farn, M.W. Stem, M.B. Veldkamp, W.B. Medeiros, S.S.	Opt. Lett., Vol. 18, No. 15, 1 August 1993, pp. 1214-1216 ADA270268
6918	Femtosecond Gain Dynamics in InGaAs/AlGaAs Strained-Layer Single-Quantum-Well Diode Lasers	Sun, C-K. Choi, H-K. Wang, C.A. Fujimoto, J.G.	Appl. Phys. Lett., Vol. 63, No. 1, 5 July 1993, pp. 96-98
6923	Machine Intelligent Gust Front Detection	Delanoy, R.L. Troxel, S.W.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 187-212 ADA273481
6924	Improving a Template-Based Classifier in a SAR Automatic Target Recognition System by Using 3-D Target Information	Verbout, S.M. Irving, W.W., Jr. Hanes, A.S.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 53-76 ADA273534

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6925	Performance of a High-Resolution Polarimetric SAR Automatic Target Recognition System	Novak, L.M. Owirka, G.J. Netishen, C.M.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 11-24 ADA273475
6928	Optical Materials for Excimer Laser Applications	Rothschild, M.	Opt. Photonics News, Vol. 4, No. 5, May 1993, pp. 8-15
6931	Resonant Tunneling Diode Oscillator as an Alternative LO for SIS Receiver Applications	Blundell, R. Papa, D.C. Brown, E.R. Parker, C.D.	Electron. Lett., Vol. 29, No. 3, 4 February 1993, pp. 288-290
6932	Advanced Techniques for Target Discrimination Using Laser Speckle	Shirley, L.G. Ariel, E.D. Hallerman, G.R. Payson, H.C. Vivilecchia, J.R.	Linc. Lab. J., Vol. 5, No. 3, Fall 1992, pp. 367-440 ADA270414
6933	Machine Intelligent Automatic Recognition of Critical Mobile Targets in Laser Radar Imagery	Delanoy, R.L. Verly, J.G. Dudgeon, D.E.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 161-186 ADA273575
6934	Extracting Target Features from Angle-Angle and Range-Doppler Images	Hsu, S.M.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 213-227 ADA272132
6935	High-Conductance, Low-Leakage Diamond Schottky Diodes	Geis, M.W. Efremow, N., Jr. von Windheim, J.A.	Appl. Phys. Lett., Vol. 63, No. 7, 16 August 1993, pp. 952-954 ADA270566
6936	3 Gbit/s Optically Preamplified Direct Detection DPSK Receiver with 116 Photon/Bit Sensitivity	Paul, T.J. Swanson, E.A. Livas, J.C. Bondurant, R.S. Magliocco, R.J.	Electron. Lett., Vol. 29, No. 7, 1 April 1993, pp. 614-615

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6937	Effect of Back Contact Impedance on Frequency Dependence of Capacitance-Voltage Measurements on Metal/Diamond Diodes	Venkatesan, V. Das, K. von Windheim, J.A. Geis, M.W.	Appl. Phys. Lett., Vol. 63, No. 8, 23 August 1993, pp. 1065–1067 ADA272561
6938	Observation of Random-Telegraph Noise in Resonant-Tunneling Diodes	Ng, S-H. Surya, C. Brown, E.R. Maki, P.A.	Appl. Phys. Lett., Vol. 62, No. 18, 3 May 1993, pp. 2262–2264
6942	Neural Systems for Automatic Target Learning and Recognition	Waxman, A.M. Seibert, M. Bernardon, A.M. Fay, D.A.	Linc. Lab. J., Vol. 6, No. 1, Spring 1993, pp. 77–116 ADA273482
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10171	Optical Modulators for Analog Link Applications	Betts, G.E. Johnson, L.M. Cox, C.H. III	SPIE, Vol. 1794, Integrated Optical Circuits II, 10-11 September 1992, pp. 376-381
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